

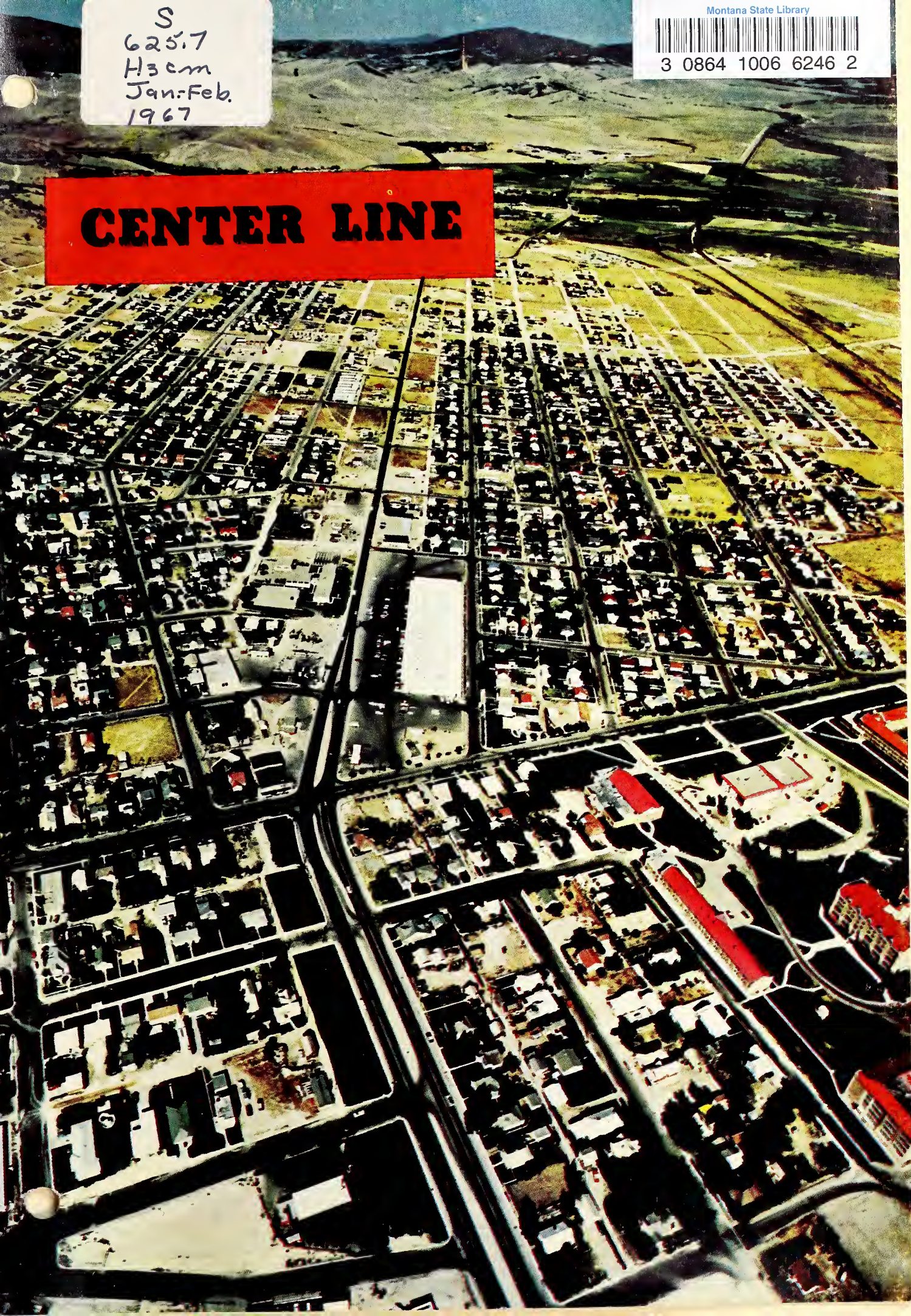
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CENTER LINE



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CENTER LINE

Volume IX Number 3

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Center Line is published every other month in the interest of the monagement, employees and others dedicoted to the Montana highway program. It is designed to present information on highway construction, progress, people and places.

FRONT COVER

The Highway Department photo lab has begun to produce color aerial photographs, and this picture was taken above Helena. The camero looks west on Euclid Avenue. The ovenue now narrows ot the Lundy Shopping Center, but plans far widening the roadway have been put into action. The Highway Department recently let the cantract for the 2.4-mile Euclid Avenue widening project. This colorful aerial photo takes in Corroll College on the bottom right, and extends to the for edge of the city to the west.

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Aerial Photography

A black and white aerial photograph showing a city with a grid street pattern, a river winding through it, and surrounding rural areas with fields and some industrial structures.

THE phrase "aerial photography" is creeping into more and more vocabularies, and it means different things to different people. To the tourist it means taking a picture from a Northwest Airlines plane window. To the geologist it means identifying soils. To the forester it means identifying trees without having to cut his way into a forest to physically inspect them.

But to the Montana Highway Department, aerial photography means another important word—photogrammetry. Aerial photographs are the basic tool from which contour maps are made, and contour maps in turn are a basic tool for designing highway routes.

The Montana Highway Department first used aerial photography in 1956, when they hired a commercial company to take some pictures for them. Realizing the value and necessity of this photography to the workings of the Highway Department, the Commission set up its own aerial equipment in 1958. Special cameras were installed in the Highway airplane, and photographers in the department's photo lab began to work seriously to perfect the method.

Today, aerial photography is as much a part of the Highway

Department photo lab as drawing ink is a part of the Road Design section. It begins with a team — Marv Kalland, photographer, and "Swede" Lindgren, Highway pilot. Marv, often assisted by Garry Wunderwald, spends much of his time taking aerial photographs at the request of some department head in the Highway.

The Highway Department airplane is equipped with a spe-

cial camera designed to take sequences of 9" x 9" photos of the ground as the plane passes over. With good weather and light conditions, the crew takes off with everything necessary for shooting. As the airplane nears the area to be photographed, Marv zeros the pilot in on the flight line and matches some special lines in the camera viewer with the ground until these lines seem to "stop"

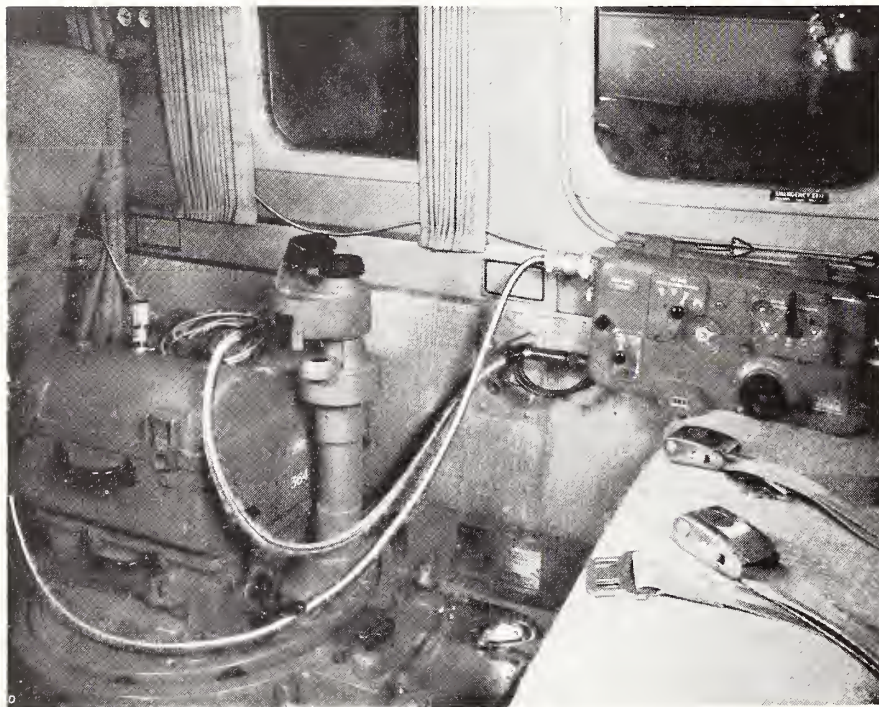
above the area. This assures that proper overlap for stereoviewing in the photogrammetry process will be achieved. Then the camera must be leveled and lined up with the direction of travel — which, because of wind conditions, is not necessarily the same as that direction in which the plane is pointing.

The aerial photographs are shot in long strips, with succeeding pictures overlapping one another by 60 per cent. This is necessary for the process of producing contour maps from the photos.

In the case of an oblique picture (a shot which includes the horizon and some sky), pilot Swede passes the subject in sweeping turns, and the photographer must see that the horizon appears level. Needless to say, a good sense of balance is a must for the aerial photographer.

Marv works with a camera mounted in the belly of the plane. The shots are a standard 9" x 9" and come on a continuous roll of film. As the roll is used, the camera records along with each picture a number of small indicators. These show the level of the camera, the time of the day, the altitude and some technical lens data.

The photo lab in the Highway Building develops the aerial film with extreme care, for the development can make or break the photogrammetry



Above, mounted in the Highway Department airplane, this special aerial camera resembles a maze of dials. Each dial is carefully set with flight plans for aerial runs. The camera is set into the belly of the plane and shoots a series of overlapping aerial photographs. Below, Marv Kalland, Highway photographer, follows a map to get exact bearings on the position above the area to be photographed.

methods to follow. Darkened spots in the negatives must be lightened to show any and all topographic features of the land.

The long roll of negatives is developed with the use of special equipment, and then printed on glass plates. These glass prints are the same as prints on photographic paper, but they are, of course, transparent. These glass plates are then taken to the Kelsh Plotter room and the most useful end result of aerial photography begins to take shape.

Photogrammetry is the art of mapping by means of aerial photography, and these glass prints are the first step to compiling maps. With the use of the Kelsh plotting machine, the trained operator can look at a miniature relief of hundreds of miles and tell the height and placement of mountains, buildings and highways.

And this is how he does it.

The glass plates are numbered in the order of succession, and adjacent prints are placed in two "projectors" high above the head of the plotter operator Jack Anthony. Through special lighting and equipment, the 60 per cent of these two glass negatives that overlaps, then, becomes a three-dimensional picture. The two overlapping pictures meet on a flat surface below, with the help of special glasses with one blue lens and one red lens, the picture rises into a third-dimensional photograph.

Using altitude information gained from surveyors on the ground at the site photographed, the plotter uses a small dot regulated on a special instrument to follow the contour of the ground in the picture.

He can then draw in contour

from the varying elevations of the terrain, and from this the highway designer can place a roadway and determine the various cuts and fills necessary to level the road bed.

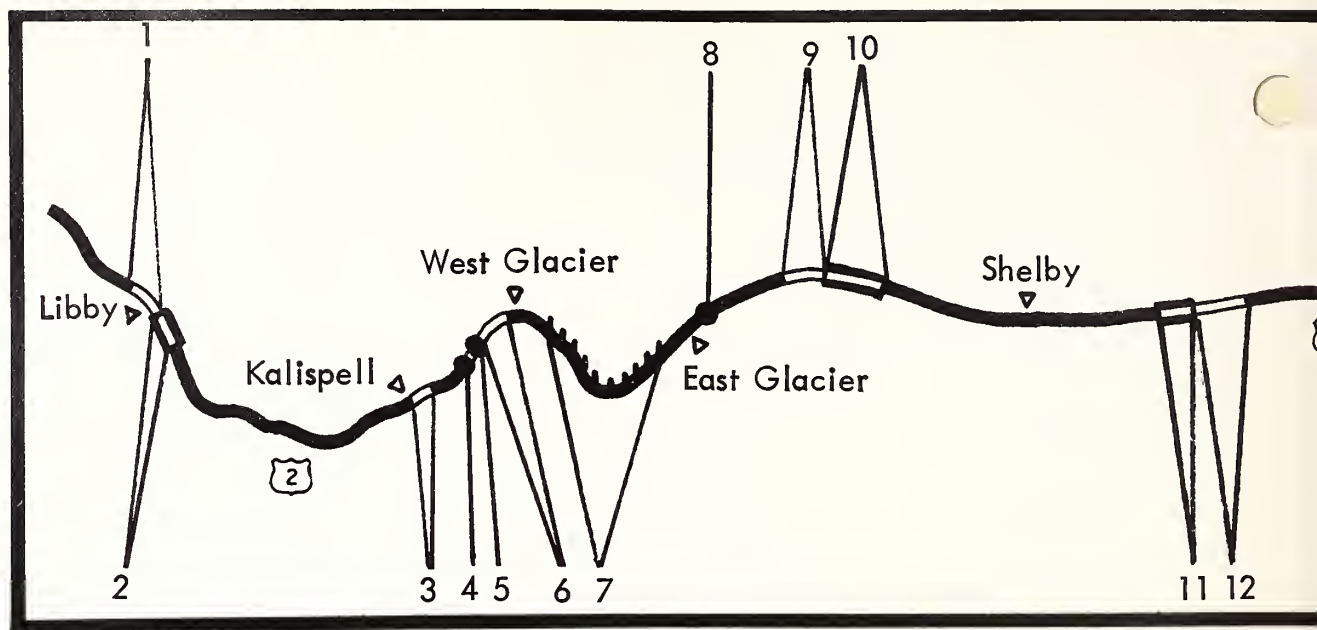
But aerial photos are not used for photogrammetry alone. Suppose the Right of Way Section has some trouble procuring land. They often use the aerial photos to locate various properties and to consider solutions to the particular problem. If there is a drainage problem on a roadway, engineers use the aerial photos to find answers to their problem. If the attorneys come across trouble

they use the aerial shots to better study their problems. And, of course, the aerals are often taken to public hearings to better demonstrate where highways will be placed.

So, often more than half a dozen different departments in the Highway Commission may make use of the aerial photographs. Since 1958, highway photographers have taken more than 120 rolls of about 200 shots each. This adds up to more than 24,000 valuable pictures to demonstrate the success of aerial photography within the Montana Highway Commission. ■



This huge machine is the Kelsh Plotter, designed to make contour maps from aerial photographs. Glass plates with succeeding aerial pictures meet on the surface below and with the use of special glasses, the photograph becomes three-dimensional. Here the two operators make a map from these 3-D pictures.



the FUTURE

THE Project Control Office of the Highway Department recently compiled a five-year projected construction plan for U.S. 2 across northern Montana. The projection lists construction and safety jobs slated for future letting on the 580-mile stretch between Libby, where the highway enters the state on the west, and Poplar, where the highway enters North Dakota.

Project numbers on the map correspond to the following breakdowns.

1. F 250 represents a section northwest of Libby. It is 3.7 miles in length and is slated for fiscal year 1969. It begins approximately 2.8 miles northwest of the junction of FA Routes 1 and 33 in Libby, and then extends southeast through Libby. The project will call for grading and surfacing of the stretch, and the roadway is programmed to be four-lane within the Libby town limits and two-lane outside the town.

2. F 330 is a 5.7-mile stretch east of Libby. It is slated for fiscal year 1970, and calls for grading and surfacing of the project. The job may also call for the construction of a bridge.

3. LSF 1-257 is a beautification project. It begins near the east city limits of Kalispell and extends 1.3 miles eastward. The beautification job is scheduled for fiscal year 1967.

4. F 257 is a future safety project. The junc-

tion of U.S. 2 and Montana 40 is slated for channelization in 1968. The junction is 1.5 miles east of the town of Columbia Falls, and will call for widening of the intersection and adding islands to properly channel the traffic.

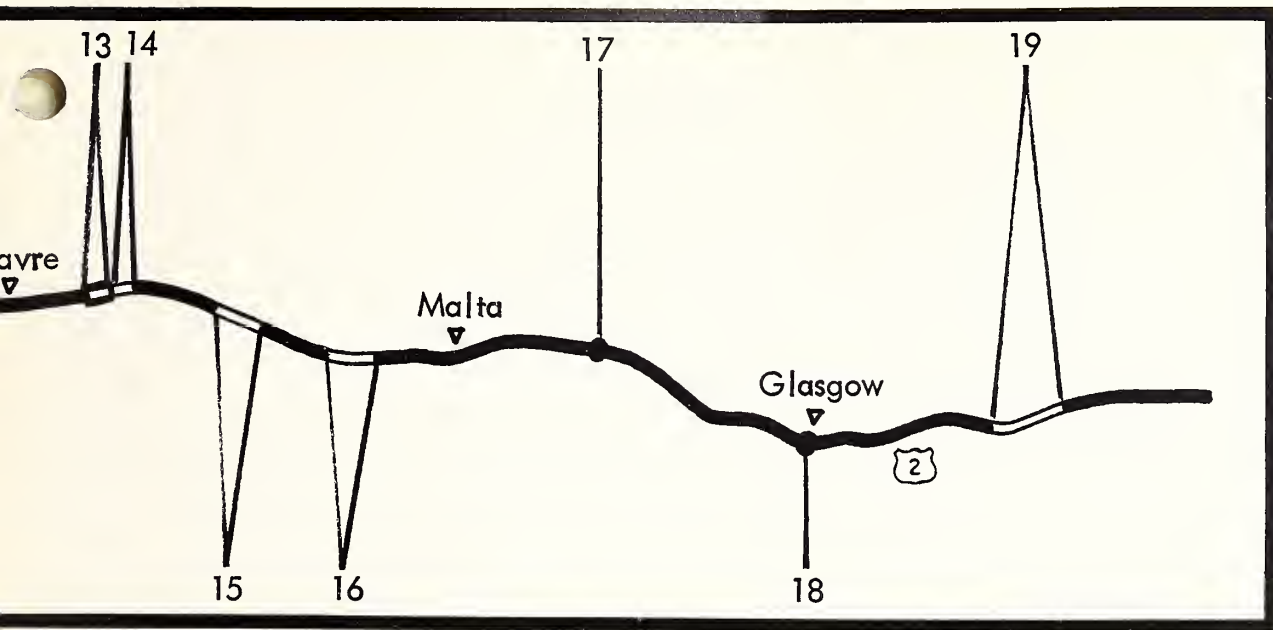
5. F 257 is another safety project. It concerns the junction of U.S. 2 and the Hungry Horse Access Road five miles east of Columbia Falls. This project also calls for the widening of the intersection and traffic channelization.

6. F 257 represents a section near West Glacier which is 10.9 miles in length. The project is slated for fiscal year 1971 and calls for the grading and surfacing of the roadway. The job will begin approximately 4.8 miles east of Columbia Falls and will extend northeasterly for the 11-mile length.

7. FHP 13 is a stretch of roadway between West and East Glacier. It calls for grading and surfacing and will be let during fiscal years 1968 and 1969.

8. F 196 is another safety project programmed for the junction of U.S. 2 and U.S. 89 two miles east of Browning. The project calls for the channelization and illumination of the intersection. The work is slated for the fiscal year 1967.

9. F 200 is a 2.1-mile project southwest of Cut Bank. The job, slated for fiscal 1968, begins



of U.S. 2

.4 miles southwest of the town and extends in a westerly direction. The contract will call for grading and surfacing of the stretch.

10. F 220(11) extends 7.3 miles between Cut Bank and Ethridge. The project was let in July of 1966 and begins at Main Street and 9th Avenue in Cut Bank and extends south-east. The project will require the grading and surfacing of the roadway.

11. F 132 represents a section near Chester. The project is 10 miles in length and is slated for letting fiscal year 1971. The job will begin at the Liberty-Hill County line and will extend westerly. Grading and surfacing of the section will be called for.

12. F 132 is a section extending west from Rudyard. It will be 9.5 miles in length and will call for the grading and surfacing of that stretch. The job, slated for fiscal year 1969, will begin at the Liberty-Hill County line and will extend easterly.

13. F 66 represents a .09-mile section west of the city limits of Chinook. The project is scheduled for fiscal 1970 and calls for the grading, surfacing and curbing of the section.

14. F 221 extends .5 miles on First Street in the town of Chinook. Slated for fiscal year 1970, the project begins at the west city limits and continues to the east city limits on First

Street. Grading and surfacing, along with curbing, will be on the contract.

15. F 152(7) calls for 5.2 miles of grading, surfacing, and the construction of a bridge near Harlem. The project, slated for fiscal year 1968, will begin at the Fort Belknap Indian Agency and extends 5.2 miles northwest to a point west of Harlem.

16. F 152 is partly a safety project. It calls for the grading, surfacing and construction of a bridge near Dodson. The job will be let in fiscal year 1969 and will begin at the Blaine-Phillips County line and extend in an easterly direction for 7.4 miles to the west city limits of Dodson.

17. F 142 represents a safety project set for Saco. It calls for construction of a pindown curb, guide post, and delineators on Front Street and Taylor Street. The project will be let in fiscal year 1967.

18. F 155 also represents a safety project. The job begins at the north city limits of Glasgow and extends to 7th Street North. The project, set for letting in fiscal 1967, will call for pindown curbs, guide posts, and delineators.

19. F 240(12) extends 14.2 miles from Poplar to Brockton. Set for fiscal year 1968, the project will call for the grading and surfacing of the roadway between the two towns. ■



SUPER SLEUTH

THAT easy-going fellow with the glasses isn't poking around the Highway machinery for nothing. And he doesn't spend half his time with the Highway Patrol officer just to discuss the weather. And he hasn't spent the past five months teaching a driver's improve-

ment course just because he enjoys teaching.

He is hard at his job in each of these cases, and he does these things because he is good at his job and because he cares. He's Clint Fulkerson, and his title is Safety Director of the Montana Highway Commission.

The Safety Section of the Commission was created to fill a need in the Highway Department, and under Clint the section has blossomed into a vital part of the everyday highway activities. When he accepted the position of Safety Director five years ago, Clint had to start from the bottom.

He checked safety rulings in other state highway departments, he studied with the National Safety Council, and he used personal ingenuity to get a grasp on what was needed for Montana. From there his work has expanded yearly, and now he and his three assistants — Bob Lee, Vern Gray and Gary Garden—are kept busy every day of the week.

Safety Director Fulkerson innovated several policies for the safety of Highway workers. His section pioneered first aid programs in each of the divisions. They established speed limits for state vehicles. He pushed the installment of seat belts in every Highway vehicle. He oversaw the production of a Safety Manual for individual employee reference. And just this past summer the Safety Section began teaching the Driver's Improvement Program to each of the 2,400 Highway Department workers.

Part of Clint's job begins in his office. Each month when the Highway Patrol revokes hundreds of Montana driver's licenses, the Safety Section carefully checks this list with the names of Highway employees. Clint maintains his own file of each worker's Highway Patrol record, and if a suspension pops up, the employee's immediate superior is notified that the worker will not be allowed to drive state equipment until he has a valid driver's license.

The Safety Section works in close conjunction with the Highway Patrol on several matters. Copies of patrol reports on accidents involving Highway equipment are automatically forwarded to Clint. The Safety Director's car is equipped with a radio on patrol frequency, and he learns almost immediately of any employee or equipment mishaps. The Highway Patrol cars are constantly on the lookout for orange cars exceeding the Highway Department daytime speed restrictions. Since they have no legal reason to stop the car (Montana does not have a daytime speed limit), the patrolman makes a note of the car license or number and forwards this information to Clint. Night speed violations are also forwarded to the Safety Section from the Patrol.



Clint frequently checks the many fire extinguishers placed in the highway offices and shops: He keeps the extinguishing solutions up to date and checks to see that the equipment is working. Below, Safety Director Fulkerson checks the blinking light atop a Highway Department sander. A major part of Clint's job entails careful checks of highway vehicles.



The Safety Director himself is constantly on the road checking workers for safe vehicles operation. The Department daytime speed limits range from 50 to 70 miles per hour, depending on the type of vehicle in use. Although there is no legal penalty for fast daytime driving in Montana, the Highway Department penalty is one week off without pay.

The Safety Section investigates each accident personally whenever it is possible. Personal injuries on the job are investigated in conjunction with the Industrial Accident officials. The purpose of accident investigations, according to Clint, is "to determine what caused it, and how it could have been pre-

vented by a change in equipment, system or method."

Each division of the Highway Department has a review board which meets regularly to review accidents. They decide whether an accident is chargeable to an employee's record. The Board reads the reports from the employee involved with the accident, from the Highway Patrolman, and from the Safety man if he personally investigated the accident. The Board determines if the accident is chargeable, and the worker is notified. The employee may appeal if he feels he has been wronged.

Employees charged with one accident are reprimanded for their carelessness. A second



The Highway Department Safety Director works closely with the Montana Highway Patrol. Here Clint talks with Al Mues, patrolman. Clint's car is equipped with a radio tuned to Highway Patrol frequency, and he often receives calls from them concerning a Highway Department accident. The Highway Safety Director also keeps a file of each employee's driving record with the Highway Patrol, as well as keeping a close check on all names listed by the Patrol for license suspensions.

chargeable in a three-year period means time off without pay, and the third chargeable makes the employee subject to dismissal.

The Safety Section works with the Construction Section to program preconstruction conferences for contractors working on highway projects. The contractors are informed of Highway rules and safety requirements for road-way or structure work.

The Safety Section conducts first aid classes throughout the state. The class for Highway workers is the standard Red Cross 10-hour program. Several of the Highway divisions have qualified instructors, so the Safety Section gets help from them. This cuts down on the amount of traveling required of the first aid instructors.

But the Driver's Improvement Program does demand considerable travel. As qualified instructors of the National Safety Council course, Clint and his assistants spend many long hours on the road to reach every single employee in each division of the Highway Commission. The 8-hour course was initiated in the spring of this year, and the instructors have since been traveling the state to reach each individual. More than 1,800 employees have taken the course on defensive driving, and by the end of the year, the Safety Section hopes to have reached each of the remaining 600 workers.

Clint, while traveling his more than 40,000 miles in a year, holds numerous "Tailgate Safety Sessions" with crews working on the highways. He checks equipment for lights, makes sure the signing is adequate, and that the men are wearing safety vests if needed. He usually takes time to discuss safety with the crews and gives them hints for proper safety on the job.

"Safety can't be forced on workers," Clint claims. "It must be sold to a person. We can't make each worker operate safely—he has to do it by his own initiative. We try to stay away from hard and fast regulations whenever possible, but sometimes there is no other way. Most of all, we must plug safety constantly and sell our product to each worker."

Besides these major projects, Clint checks fire extinguisher equipment in the Highway Buildings, he is always on the watch for some office hazard to safety, and he oversees a six-month check of every Highway Department shop in the state.

To put it simply, that easy-going fellow with the glasses is responsible for the safety of all equipment and personnel in the Highway Department. He has to be on the lookout for possible hazards, he has to correct these problems, and in case of an accident he has to be "Johnny-on-the-spot." But his record speaks for itself. The insurance payments to the Highway Department, as well as the vehicular losses, have dropped drastically during the past five years.

It pays off to have a Safety Director. We are improving our safety record, and we owe it to one of the most industrious departments in the Highway Commission. ■



Part of Clint's many duties includes checking the first aid boxes in Highway buildings. In the Helena equipment shop, above, Clint thumbs through the cabinet to see that no items are missing.

DO YOU know what Montana state employee's credit union is, and what it can do for you? Are you aware that free life insurance is offered to match the funds you put into the credit union? If you are like many highway employees, you probably don't even know you CAN join such an organization. Well, if you do have any questions about the credit union—here are the answers.

What is a credit union? It is a non-profit cooperative organization chartered under state law and operated by its members according to those laws. It may be considered a fringe benefit to being an employee of the State of Montana.

What is the purpose of a credit union? The credit union strives to encourage regular savings by the members and to make loans at a low rate of interest to its members.

Who can join, and how? All employees of the State of Montana and members of their immediate family living under the same roof are eligible to join the credit union. It costs 25 cents and the initial investment of one share of the credit union (shares are \$5.00 each and are paid dividends from the net earnings), or an installment on the purchase of an initial share to join. From then on your payments into savings automatically purchase shares for you, and your "interest" on the savings comes to you in the form of dividends from the shares.

How does it operate? The Montana State Employee's Credit Union is governed by a Board of Directors, a Credit Committee, and a Supervisory Committee. The Board, the Credit Committee and two members of the Supervisory Committee are elected by general membership at the credit

union annual meeting. One member of the Supervisory Committee is appointed by the Board of Directors. All members of the Board and committees contribute their services without pay.

The board of Directors is composed of seven members and exercises general direction and control of the credit union operation. The Credit Committee is composed of three members and is responsible for the approval or disapproval action on all loan applications. The Supervisory Committee is made up of three members, and it functions independently of the Board. It is responsible for the quarterly audits of the credit union and maintains a constant check on the financial condition and operation.

How are the funds protected? The financial soundness of the credit union is protected in several ways. The union is under the supervision of the Secretary of State, and is examined in detail once a year by State Bank Examiners. In addition, the credit union is examined quarterly by its own Supervisory Committee.

By state law requirement, reserves are set aside each year to cover the possible uncollectible loans. Also, adequate security must be obtained on all loans in excess of the signature limit, which is established by the Board of Directors.

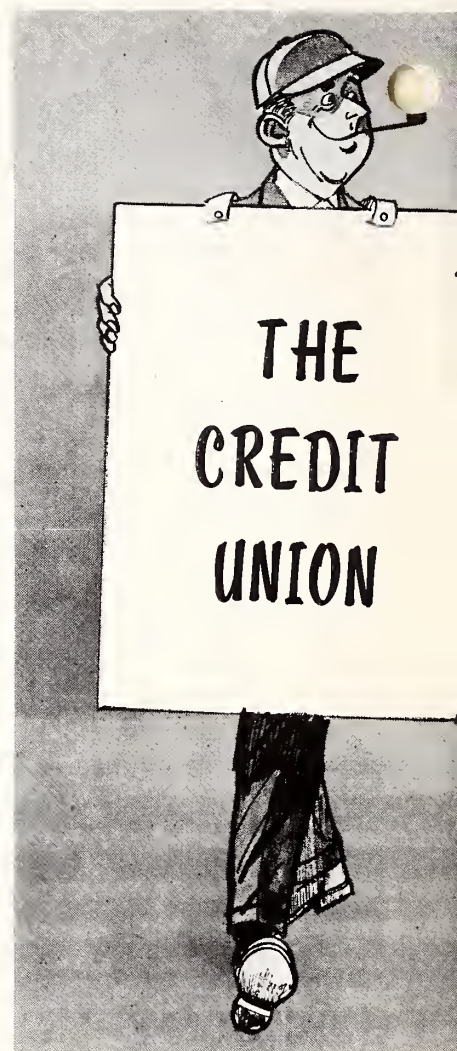
Finally, credit union funds are deposited promptly in the local bank. Directors and committee personnel are not permitted to borrow from the credit union in excess of their share holdings.

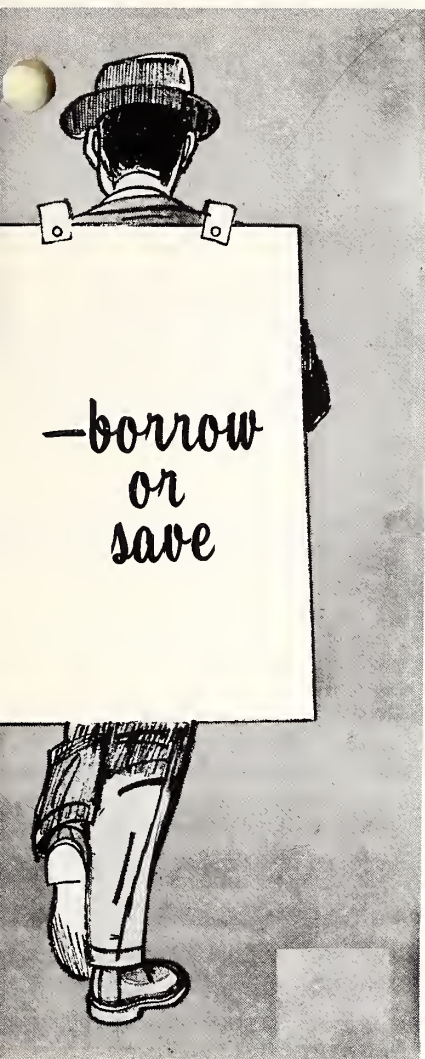
How are loans made? Loan application forms are available from the credit union office, and this form is completed by the member. The applications

are processed by the Credit Committee and approved or disapproved.

Loans may be made to any member for "provident and productive" purposes. Some of the common reasons for borrowing from the credit union include consolidation of debts, medical expenses, automobiles, farm machinery, real estate, education, vacations, and many others.

Signature loans may be made to members at a designated amount determined by the Board of Directors in individual cases. On the other hand, secured loans may be made by using such collateral as cars, real estate, stock, furni-





ture, appliances, shares in the credit union, and so on.

Loans may be made for a period of time limited by the Board of Directors but not to exceed five years. Payments on loans or share deposits may be made in person at the credit union office or may be mailed to the office. Most loans are repaid on a monthly basis at the rate of interest of one per cent per 30 days on the unpaid balance. For instance, a loan of \$100 would cost only \$1 if repaid in 30 days. One per cent is the maximum rate of interest allowed by state law for credit union loans of any amount.

All loans made from the credit union, up to \$5,000, fully

insures the borrower for the full amount of the loan. This is at no additional cost to the borrower. If the borrower should die or become totally and permanently disabled, the remainder of his loan at that time would be paid in full.

Dividends. The Board of Directors declares the amount of dividends to be paid to the credit union shareholders. These dividends are paid from the net income or earnings of the credit union operation, and are regulated by the six per cent maximum dividend authorized by the state. Last year the credit union paid four per cent dividends.

Credit union life insurance. Each time you make a transaction with the credit union for either savings or loan, you automatically become a life insurance policy holder in a free insurance program. This life insurance matches the money you deposit in your account at the credit union, up to a maximum of \$2,000. In the event of your death, your beneficiary will receive an insurance payment equal to the amount of money deposited in your credit union account up to \$2,000. In other words, your beneficiary would receive up to \$2,000 for your life insurance, in addition to money in your account.

There is no additional cost to the members for this added benefit. The credit union pays a monthly premium from its earnings to cover the expense of the insurance.

All credit union members are given this insurance coverage if they are under 70 years of age and meet the physical requirements. No medical examination is required for this coverage. You must simply be able to perform the usual duties of

your livelihood when a loan is made or deposits are made to your savings account. You could be ineligible during periods of illness, then become eligible for the coverage after you have returned to your job.

What happens after age 55?

If over 55, you will not lose the dollar for dollar insurance coverage on the money that has been deposited prior to age 55. For example, if you have \$500 in your account prior to age 55, you have \$500 of insurance regardless of your age at the time of death. However, money deposited after age 55 would be on a lesser insurance coverage basis.

What happens after age 70 or upon retirement? Deposits made at age 70 are no longer insured. However, all deposits made prior to reaching age 70 are insured according to the rate shown on the scale.

Retired persons are insured on the same basis as persons actively employed. Retirement income or sustaining income from sources other than regular employment does not prevent a member from qualifying for the \$2,000 life savings insurance. As long as your savings remain in the credit union, your life insurance remains in force. When you die, your designated beneficiary will receive your savings plus the insurance money your savings have earned.

Where is the credit union located? The Central Montana Credit Union League is located at 13 Edwards, Helena, and is broken down into individual credit unions generally located by counties. Any employee wanting more information about the credit union may contact the League to learn the location of the union for which he is eligible by residence. ■



DEDIC

to the people



THREE new sections of Interstate highway opened during October. Dedication ceremonies were programmed and the accompanying two pages depict a photographer's view of the ceremonies.

Dignitaries bowed their heads in prayer at the Billings dedication in the top left. With the help of Billings Mayor Willard Fraser, the ribbon on the new Interstate 90 section in Billings is cut. Milo Lahn, Billings district engineer, watches from



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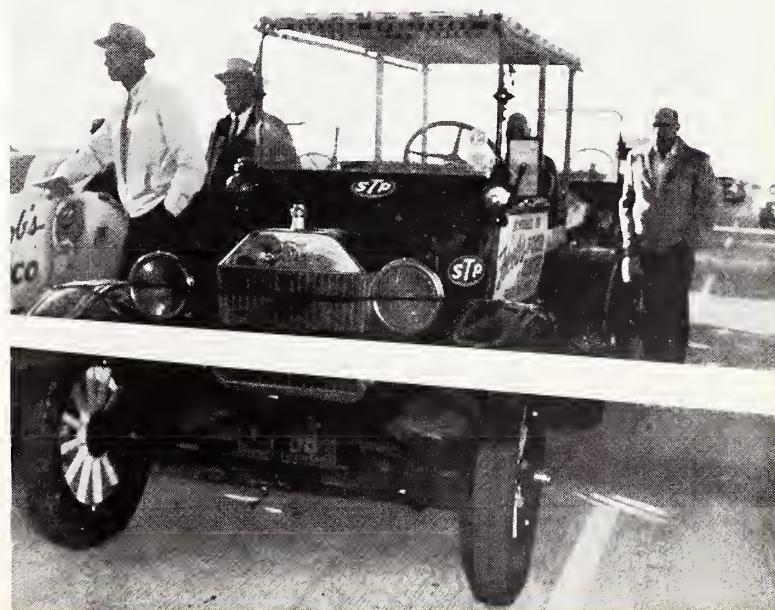
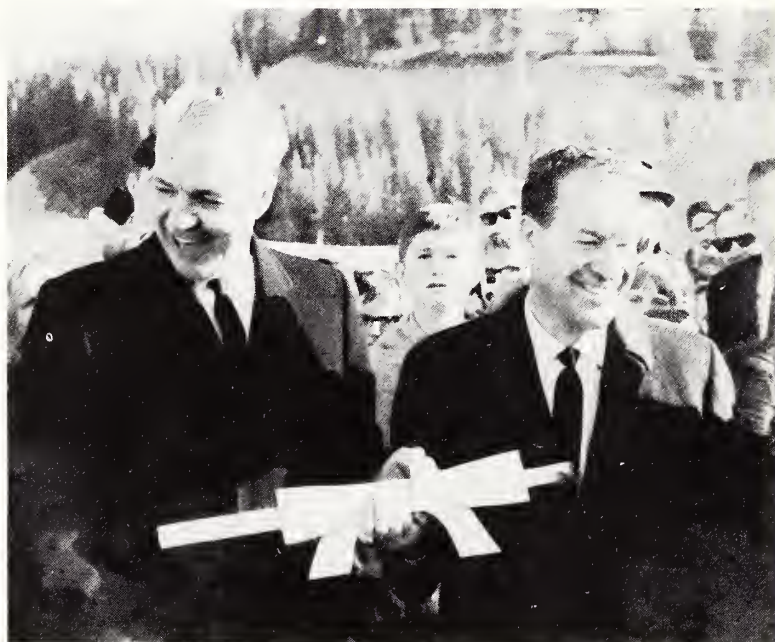
of Montana

behind while Grant Meyer of the Bureau of Public Roads holds part of the ribbon to the Governor's left (middle left photo).

Seventy-five automobiles broke-in the new Billings Interstate cradle as seen in the lower left photo.

Highway Patrol Sgt. Ernie DeDycker and Highway Commissioner Arnold Swanson hold the snipped ribbon at the dedication of a new section of I-90 between Manhattan and Bozeman in the lower picture, while an antique car awaits the ribbon cutting ceremony. The Bozeman-Manhattan opening parade was led by dignitaries riding in antique automobiles.

The opening of I-90 over Homestake Pass between Butte and Whitehall was one of the largest dedications ever held by the Montana Highway Department. In the pictures to the right, Gov. Tim Babcock and Representative Arnold Olsen are shown holding the bow of the thin copper ribbon used for the formal ceremony. The photo in the upper right indicates some of the huge crowd which turned out for the dedication atop the Continental Divide. More than 1,500 cars and some 4,500 people were in attendance for the second crossing of the Continental Divide by Interstate highway in the United States. ■



A New "Angle"



Above, the sawed joints in this concrete highway are placed perpendicular to the roadway center line. This method for allowing for concrete expansion and contraction is said to create a thumping as vehicles pass over. Below, the joints are sawed into the concrete at an angle to the center line. This is part of a new method designed to keep noise to a minimum as a car travels on the highway.



HIGHWAY rumble is becoming a sound of the past in Montana.

The rumble is that maddening THUMP—THUMP—THUMP as motor vehicles pass over controlled joints in concrete sections of highway. But now new construction techniques being employed in Montana this year will eliminate this monotonous highway music from most future concrete roadways.

Highway rumble has three basic causes: vehicle wheels passing over joints at the same time, improper filling of the joints with expansion material, and uneven cracking of the concrete. In the early days of concrete paving, highways were blocked off into rectangles with wooden or metal forms. Joints then were created by the removal of forms after the concrete had cured. These joints were then filled with an expansive material. These concrete slabs, ranging in length from 20 feet upward, would then go together to create the highway.

Today, concrete paving machines have almost entirely replaced the old box-form method of laying concrete roads. Pavers form continuous ribbons of concrete. Joints for expansion are then formed and contraction joints sawed into the surface and expansive material is placed into the joints.

But concrete paving machines are not the only improvements made in concrete paving techniques over the past few years. Much research has unveiled other improvements.

For example, research has determined that concrete slabs shrink and crack every 12 to 20 feet, and this is normal. Thus, contraction joints are now being sawed at 15-foot intervals to allow "controlled" cracking. Joints are also cut to uniform depth and alignment to allow controlled filling of the joints with improved expansion materials.

This controlled cracking and uniform filling

for Concrete

of joints has eliminated two of the causes of rumble. The third cause, vehicle wheels passing over joints simultaneously, is being eliminated by sawing joints at an angle to the highway center stripe rather than perpendicularly to it.

The diagonal sawing of joints is probably the most obvious change in concrete paving because it is visible to motorists. Older sections of highway have joints which are perpendicular to the road edge. That is, the joints are cut straight across the highway. Hence, both front wheels THUMP over the joint and then both back wheels THUMP over the joint.

Beginning this year, diagonal joints will be used. The joints are sawed at about nine degrees across the roadway surface. Consequently, wheels pass one at a time over the joints.

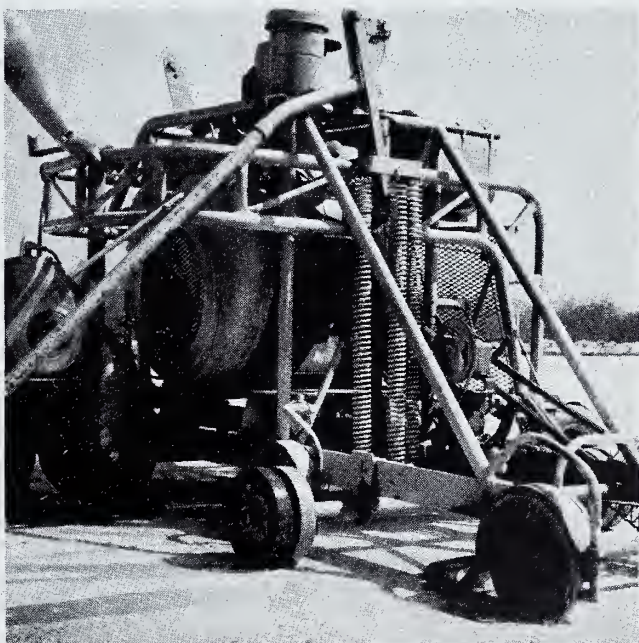
"The difference between perpendicular and diagonal joints is as bold as night and day," reports George Barrett, division engineer in Bozeman for the Montana Highway Department. "We have both cuts in the Bozeman area, and I would say with the diagonal cuts our rumble problems are almost gone."

Continued research by all associated with building highways goes on. For example, research is being conducted in Montana on the spacing of concrete joints at varied distances. One highway in the Great Falls district has joints spaced at 12, 13, 15 and 19-foot distances in a repeated sequence on the same roadway. The idea is to break up the hypnotic rhythm of evenly spaced joints.

Cutting at varied intervals has had little effect on the driver and the rumble is not noticeably changed, however, according to highway engineers. Meanwhile, this and other experiments will go on toward the goal of smoother and safer highways when and where concrete is used. ■



The picture above was taken near Missoula, where this mammoth concrete paver was used to lay sections of Interstate 90. The paver sets down a continuous ribbon of concrete. After the pavement is cured, a special saw, pictured below, cuts about two inches into the concrete at certain distances to allow for expansion, contraction, and controlled cracking of the roadway.



Sand Coulee Curve

THE straightening of a curve on an eastern Montana highway represents the kick-off to the Highway Department's spot hazard safety program.

Although not originally scheduled for construction until 1969, the rebuilding of Sand Coulee Curve was upped on the calendar when federal funds became available for the financing of a spot hazard safety program in our state. The curve had been considered a prime project for the Safety Program since the dangerous roadway was the cause of six deaths since 1960.

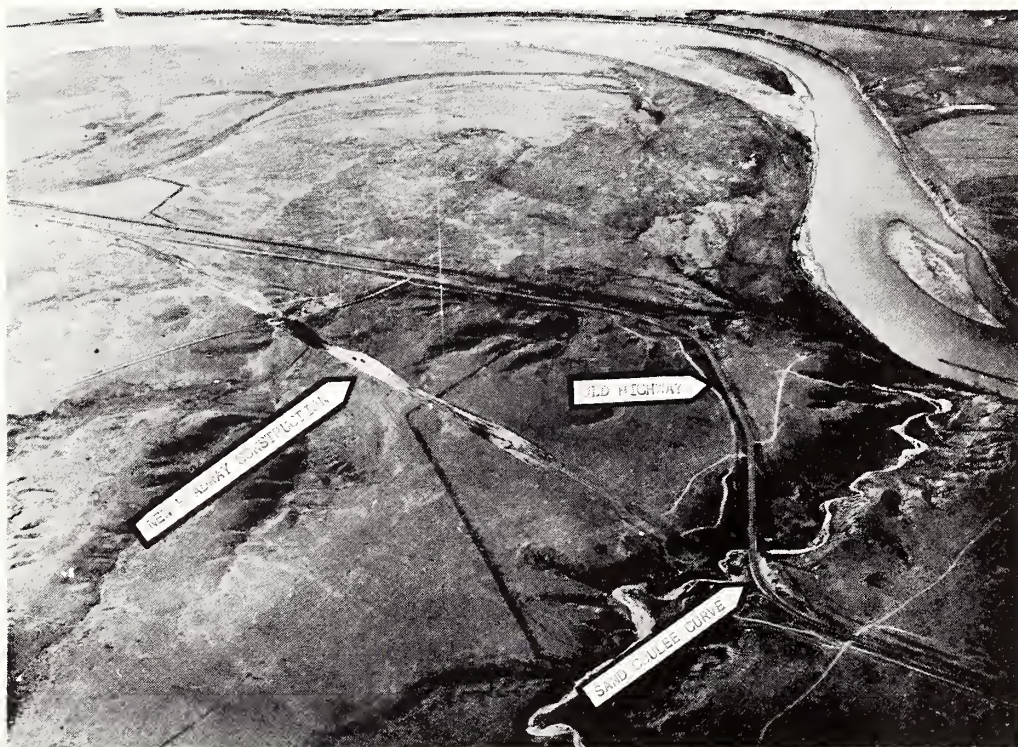
The Sand Coulee project was moved up three years, and the contract for the reconstruction of the curve was let on March 22, 1966. The project was set to be completed with-

in seven months.

Hilling Construction Company, Williston, N.D., won the construction contract for the bid of \$145,541. Work began almost immediately to straighten approximately 1.5 miles of the curve.

Today the roadway looks entirely different. The pictures below illustrate the improvements at Sand Coulee. Designed and rebuilt under Bill Brittain, area district engineer, the hazard has been entirely eliminated.

And this is just the beginning. Already the Highway Department has several spot hazard projects on the books. Each district engineer has been requested to submit a list of priority projects for his area, and these will be added to the program. ■



Highway

MAIL BAG

Dear Sir:

Thank you for the literature sent in regard to your highways and points of interest. We did drive to Glacier and Yellowstone Parks and the roads were beautiful. I was amazed at the nice wide roads within Glacier Park. I surely enjoyed the west and the "Big Sky" state.

Frances Pearson
Hallock, Minnesota

Dear Hostess:

We certainly enjoyed the scenic parts of our trip, but did not have the time to take in many other sights. We enjoyed our stay at Glacier Park and explored it thoroughly. Your friendly and courteous help in answering our inquiries and in arranging our stay at Porters was a pleasure to both of us.

Mr. and Mrs. L. C. Miller
Pico Rivera, California

Dear Hostess:

We wrote to several state highway departments for information about roads, etc., but your office was the only one

to reply with a personal letter and answers to our inquiries. We wanted you to know that we did very much appreciate your taking time to write such a helpful letter.

If you folks are a sample of the friendly people of Montana, we would like to do more than pass through your state, but we regret that time will not permit us to do more than that on this trip.

Mrs. Walt Workentine
Kansas City, Missouri

Dear Highway Hostess:

We enjoyed our trip to Montana very much. It was our first experience at family camping and we would all enjoy returning to spend more time. We were especially delighted with the beautiful green valleys and the small lakes. My husband was so impressed he is hopefully planning a two week fishing trip in western Montana with friends.

The main problem we had was not being able to find camp sites with shower facilities. The National Park camps were very clean, but the lack of shower facilities was most distressing. The eastern approach to Glacier was very limited.

We found Glacier Park to be every bit as beautiful as the travel folders indicated. Due to our lack of time we went directly from Helena to St. Mary so we could cross the entire park. Even though the route to St. Mary is not as scenic as others, it is a rather impressive trip to go through such wide open country. One can certainly get the feeling of "Big Sky."

Thanks again for your help and information.

Mrs. L. J. Pesek
Salem, Oregon

Mr. Johnson:

I think the September-October Center Line is the best ever.

I was impressed, first, with the very effective use of graphics. The art and layout actually induced me to read the magazine, and what really surprised me was that the copy lived up to what was promised.

You do a real good job.

Sincerely,

Randolph Russell

Director of Public Relations

American Road Builders'
Association

Washington, D. C.



When winter first creeps up on the Helena headquarters, it often takes unusual and beautiful forms. Last winter a heavy frost attached itself to the trees and bushes in the city. The next day the sun shone brightly from a clear sky, and the effect was breathtaking. The trees crackled and glittered, creating a beautiful scene from Highway Building windows. The entire city was captured in this silvery splendor, and the photographers took the opportunity to get some exceptionally fine shots.